

FERDINAND STATE FOREST LAKE
Dubois County
2005 Largemouth Bass Population Estimate and Panfish Assessment

Daniel P. Carnahan
Fisheries Biologist



Fisheries Section
Indiana Department of Natural Resources
Division of Fish and Wildlife
I.G.C.-South, Room W273
402 W. Washington Street
Indianapolis, Indiana 46204

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EXECUTIVE SUMMARY

- Ferdinand State Forest Lake is a 42-acre impoundment located in Dubois County.
- A largemouth bass population estimate was conducted in April and May 2005. A panfish assessment was conducted in May that targeted bluegill and redear sunfish. Night electrofishing was the only sampling gear used during both investigations. An aquatic vegetation survey was conducted in July as part of the panfish assessment.
- Both bass and bluegill fishing has improved since the imposition of the slot limit. The bass population estimates have shown a significant decrease in the number of bass between 8 and 12 in and an increase in the number of 15 in and larger bass since 2003. The bass reduction has improved bass growth, hence increasing the number of larger bass in the lake. The bluegill stock densities all improved, most notably the proportion of bluegill greater than 8 in. Also, the BGFP increased from 24 to 27 and now classifies the lake as having excellent bluegill fishing.
- It is recommended that a bass population estimate and panfish assessment be conducted in 2008 following the 2005 procedures.

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INTRODUCTION

Ferdinand State Forest Lake is a 42-acre impoundment built in 1953 by the Works Progress Administration. The lake is located in Ferdinand State Forest, which is approximately 7 mi east of Ferdinand. Facilities around the lake consist of a swimming beach, two one-lane boat ramps, boat rental, picnicking shelters, and a campground. Approximately 60% of the shoreline is accessible to bank fishing. There is a \$4.00 daily entrance fee and a \$5.00 non-motorized and a \$20 motorized annual lake pass for boats. Annual passes for both entrance and boat launching are available.

A largemouth bass 14-in minimum length limit was established in 1973. In January 2002, the bass regulation was changed to a 12 to 15-in protective slot limit. The slot limit was enacted to improve the size structure of the largemouth bass population. Channel catfish are stocked at a rate of 13/acre (525 fish) every 2 years and the last stocking occurred in 2004.

The largemouth bass population estimate and bluegill assessment were conducted to evaluate the impacts of the slot limit. The surveys were done under work plan 202478 entitled, "General Management of Fisheries in Impoundments and Excavated Lakes."

METHODS

Population estimate

Largemouth bass sampling effort consisted of pulsed DC night electrofishing 1.41 h on April 25, 1.54 h on May 2, and 1.42 h on May 9, 2005. Two dippers collected the stunned bass. All bass were measured to the nearest 0.1 in and the right pectoral fin was removed to mark each bass captured. The population size was estimated using the Schnabel population estimate as described by Ricker (1975). Stock density indices (PSD and RSD) were used to assess the largemouth bass population (Anderson and Neumann 1996). Scale samples were taken to determine age and growth. Weights were estimated from the district averages. A single factor analysis of variance statistical test was used to compare some of the pre and post slot limit bass data. All the previous population estimates were conducted using the same methods.

Panfish assessment

Bluegill and redear sunfish were sampled on May 23, 2005. Fish collection effort consisted of 0.75 h of pulsed DC night electrofishing. Two dippers collected the stunned fish. Bluegill and redear sunfish were measured to the nearest 0.1 in and weights were estimated from

the district averages. Stock density indices (PSD, RSD, and BGFP) were used to assess the bluegill population (Ball and Tousignant 1996). Scale samples were taken to measure age and growth. An aquatic vegetation survey was also conducted on July 27 according to Pearson's methods (2004).

RESULTS

Population estimate

A total of 821 largemouth bass was sampled during the population estimate. They ranged in length from 4.3 to 20.7 in. The population size for all bass was 1,442 with a 95% CI of 1,132 to 1,901 and a SE of 13% (Table 1). The population size for stock size bass (≥ 8 in) was 567 (95% CI of 464 to 711) with a SE of 10%. The population size for bass greater than 14.9 in was 66 (95% CI of 35 to 135) with a SE of 33%. The stock size bass population estimates were significantly lower ($F_{(1,3)} = 31.69$, $P = 0.01$) and the greater than 14.9 in estimates were approaching being significantly higher ($F_{(1,3)} = 6.35$, $P = 0.08$) after the slot limit was enacted. Population estimates in 2003 were similar for the all bass and stock size bass category estimates, and substantially lower for the greater than 14.9 in estimate. Population estimates for previous years are also listed in Table 1.

The 2005 bass electrofishing catch rate was 182/h. Catch rates in 1994, 2001, 2002, and 2003 were 392, 379, 264, and 207 per h (Carnahan 2004). Electrofishing catch rates by length group have fluctuated between all the population estimates, but catch rates for bass less than 12 in have been high from 1994 through 2002 (Table 2). The only significant change in catch rates was a reduction of 145 bass/h in the 8.0 to 11.9 in group from 2002 to 2005 ($F_{(1,3)} = 11.00$, $P = 0.04$). The 12.0 to 15.0 in-group catch rate has been increasing since 2001. The catch rates for this length class have increased from 9/h in 2001 to 24/h in 2005. The 15.1 to 18.0 in-group catch rate showed a substantial increase from the less than 1/h in 2001 and 2002 to 8/h in 2005. The greater than 18.0 in length group slightly increased from 2002 levels.

Largemouth bass proportional stock density (PSD) and relative stock density (RSD14 and RSD15) indices have all significantly improved since the slot limit imposition (Table 3). The bass PSD's were significantly higher in 2003 (28) and 2005 (37) compared to preslot limit years (range 6 to 11) ($F_{(1,4)} = 54.04$, $P < 0.01$). The RSD14 value increased from a low of 3 in 2002 to

17 in 2005 ($F_{(1,4)} = 16.98$, $P = 0.01$), and the RSD15 index value increased from 1 (1994 to 2002) to 11 ($F_{(1,4)} = 10.24$, $P = 0.03$).

Bass growth has improved since the imposition of the slot limit for all ages. However, the only significant increase in bass growth, when comparing pre and post slot limit data, was for age-5 bass ($F_{(1,3)} = 11.82$, $P = 0.04$). Prior to the slot limit an age-5 bass ranged from 13.4 (2001) to 14.4 in (2002). In 2005 an age-5 bass averaged 15.4 in (Appendix 1). Growth since 2003 improved for age-2 bass by 2.2 in, age-3 bass by 1.2 in, age-4 bass by 0.8 in, and age-5 bass by 0.4 in.

Vegetation assessment

Naiads were the only submersed plants found during the vegetation survey. They were found at 96% of the sample sites and possessed a mean rake score of 4. Emergent plants observed were creeping water primrose, common cattail, and smartweed. Fishing access was only limited by the naiads in the lake's extreme west end.

Panfish assessment

A total of 253 bluegill was sampled that weighed 28.65 pounds. They ranged in length from 1.1 to 8.6 in. The electrofishing catch rate was 337/h. Previous catch rates have ranged from 650 (2001) to 1,216/h (2002). Bluegill PSD's have increased from 21 (2001) to 55. The RSD7 index value increased from 11 (2002) to 47, and the RSD8 value increased from 1 (2003) to 20. The bluegill fishing potential index (BGFP) score increased from a low of 24 (2003) to 27 (Table 4). Bluegill growth improved for all age classes except for age-2 bluegill. Age-3 and 4 bluegill averaged nearly 7 and 8 in.

A total of 38 redear sunfish was sampled that weighed 6.54 pounds. They ranged in length from 2.0 to 10.1 in. The electrofishing catch rate decreased from 478 (2002) to 246 (2003) to 50/hr. Redear growth was similar to 2003 results except for age-4 redear, which increased from 7.9 to 9.1 in. Growth for age 2 was average, while age-3 growth was at the high end of the average range, and age-4 growth was above average when compared to the district average.

DISCUSSION

Both bass and bluegill fishing have improved since the imposition of the slot limit. The bass population estimates have shown a significant decrease in the number of bass between 8 and 12 in and an increase in the number of 15 in and larger bass since 2003. The bass reduction has

improved bass growth, hence increasing the number of larger bass in the lake. Currently, all the stock density indices indicate that the bass population is becoming balanced and quickly producing more larger bass than was available under the 14-in minimum length limit. Bass fishing for larger bass should improve if anglers continue to harvest the 8 to 12-in bass.

One concern with implementing the slot limit was being able to maintain the good bluegill fishing because bluegill populations can become stunted if too many predators are removed from a lake. Currently, this is not occurring. The bluegill electrofishing catch rate actually decreased from 772 to 337/h. The bluegill stock densities all improved, most notably the proportion of bluegill greater than 8 in. Also, the BGFP increased from 24 to 27 and now classifies the lake as having excellent bluegill fishing.

The redear sunfish population is a bonus to panfish anglers at this lake. Their electrofishing catch rate has decreased since 2002, but was still good at 50/h.

Ferdinand State Forest Lake has always possessed a good bluegill fishery and a rather mediocre bass fishery. The goal of the slot limit was to improve bass fishing, while still maintaining a good bluegill fishery. So far this has been accomplished. However, the fishery needs to be monitored to ensure the slot limit does not allow the bluegill population to become over populated. It is recommended that a bass population estimate and panfish assessment be conducted in 2008 following the same procedures as in 2005.

RECOMMENDATIONS

- Conduct a bass population estimate and panfish assessment be conducted in 2008 following the 2005 procedures.

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Approved by: _____
Brian M. Schoenung, Fisheries Supervisor
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Table 1. Schnabel population estimate for largemouth bass at Ferdinand State Forest Lake, 1994 through 2005.

<u>ALL LARGEMOUTH BASS</u>				
Year	95% low CI	Estimate	95% high CI	SE %
1994	1,705	1,950	2,253	7.1
2001	2,404	2,818	3,197	7.3
2002	1,277	1,466	1,700	7.3
2003	1,258	1,453	1,698	7.6
2005	1,132	1,442	1,901	13.1
<u>STOCK SIZE LARGEMOUTH BASS</u>				
1994	1,190	1,367	1,588	7.3
2001	882	1,074	1,338	10.6
2002	1,001	1,159	1,358	7.8
2003	456	568	726	11.8
2005	464	567	711	10.8
<u>LARGEMOUTH BASS GREATER THAN 14.9 INCHES</u>				
1994	6	16	40	57.7
2001	0	0	0	
2002	1	4	6	70.7
2003	10	28	69	57.7
2005	35	66	135	33.3

Table 2. Largemouth bass electrofishing catch rates by length group, Ferdinand State Forest Lake, 1994 through 2005.

Length range (in)	CATCH PER HOUR				
	1994	2001	2002	2003	2005
< 8.0	75	215	44	124	93
8.0 - 11.9	282	158	202	60	57
12.0 - 15.0	30	9	18	20	24
15.1 - 18.0	3	<1	<1	3	8
>18.0	3	<1	0	<1	2
Totals	393	382	264	207	182

Table 3. Ferdinand State Forest Lake largemouth bass stock density indices, 1994 through 2005.

Year	PSD	RSD14	RSD15
1994	11	3	1
1997	10	2	<1
2001	6	<1	<1
2002	9	3	1
2003	28	9	4
2005	37	17	11

Table 4. Bluegill stock density indices and electrofishing catch rates, Ferdinand State Forest Lake, 1997 through 2005.

Year	PSD	RSD7	RSD8	BGFP	Electrofishing CPUE
1997	53	42	23	29	179
2001	21	14	2	30	650
2002	27	11	2	31	1,216
2003	35	16	1	24	772
2005	55	47	20	27	337

Appendix 1

Largemouth bass population estimate and panfish assessment data